

Application No.: 10/530,442

AMENDMENTS TO THE DRAWINGS:

Please amend the drawings to indicate that Fig. 14 is prior art.

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R E M A R K S

I. Introduction

In response to the Office Action dated December 5, 2005, Applicants have amended claim 1 and cancelled claim 2, without prejudice, in order to clarify the intended subject matter of the invention. Support for the amendment to claim 1 can be found, for example, in Fig. 1 and the related portions of the specification. Furthermore, Fig. 14 in the drawings has been amended to indicate its status as prior art. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-11 Under 35 U.S.C. § 102 and 103

Claims 1-11 were rejected under 35 U.S.C. § 102(b)/103(a) as being anticipated by, or alternatively, being obvious over Fig. 14 of Applicant's Admitted Prior Art et al. and Neidorff et al. (U.S. 5,929,577). Applicants respectfully submit that both AAPA and Neidorff, alone or in combination, fail to anticipate or render the pending claims obvious for at least the following reasons.

With regard to the present invention, amended claim 1 recites, in-part, a motor driver comprising: plural-phase windings, a plurality of transistors composed of a first group of transistors that operate as switches for supplying power from one terminal of a DC power unit to one end of each winding, and a second group of transistors that operate as switches for supplying power from another terminal of the DC power unit to another end of each winding; a position detector operable to detect a rotational position of a rotor, based on a terminal voltage of each

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winding; a current detector operable to output a current detection signal that is proportionate to a current supplied to the plural-phase windings; a switching controller that includes a forced-off signal generator operable to generate a forced-off signal that has a pulse width of a predetermined period in a predetermined cycle that corresponds at least to a clock, and a PWM signal generator operable to generate a basic PWM signal in accordance with a result of comparing the current detection signal and a speed command signal, and is operable to generate a PWM signal by AND synthesizing the forced-off signal with the basic PWM signal; and wherein the switching controller further controls such that upper and lower transistors which switch the plural-phase windings are forced into an OFF state by means of the forced-off signal included in the PWM signal, and the position detector detects only while the upper and lower transistors are in the OFF state.

The Neidorff reference discloses a motor driver which disables PWM driving in accordance with a zero cross point used to perform position detection, and normally switching noise occurs each time a switching operation is performed. After the noise has been removed by a sample and hold circuit 68 that operates in synchronization with the PWM signal, a zero cross comparator 72 detects induced voltage of the winding from which noise has been removed, to perform position detection.

In contrast to Neidorff, the motor driver recited in claim 1 of the present invention forces off the upper (21, 22, 23) and lower (25, 26, 27) transistors that drive the plural-phase windings (11, 12, 13), by means of a forced-off signal generated in accordance with a clock that bears no relation to the position detector 30, thereby suppressing generation of switching noise in the windings. The AAPA does not disclose or suggest this limitation. Thus, both the AAPA and Neidorff fail to disclose a motor driver which includes a forced-off signal generator operable to

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generate a forced-off signal that has a pulse width of a predetermined period in a predetermined cycle that corresponds at least to a clock.

Furthermore, induced noise caused by current change according to PWM driving until the transistors are forced off is masked while position detection is performed by the position detector. Thus, the motor driver of claim 1 has a unique way of generating the forced-off signal for putting the transistors into the OFF state, and the motor driver of claim 1 of the present invention has a completely different structure than that of the motor driver of the Neidorff reference. The AAPA does not disclose or suggest this limitation. Thus, both the AAPA and Neidorff fail to disclose that the switching controller further controls such that upper and lower transistors which switch the plural-phase winding are forced into an OFF state by means of the forced-off signal included in the PWM signal.

As anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, both the AAPA and Neidorff et al. do not disclose a motor driver which includes a forced-off signal generator operable to generate a forced-off signal that has a pulse width of a predetermined period in a predetermined cycle that corresponds at least to a clock OR that the switching controller further controls such that upper and lower transistors which switch the plural-phase winding are forced into an OFF state by means of the forced-off signal included in the PWM signal, it is clear that both the AAPA and Neidorff et al. fail to anticipate claim 1 of the present invention.

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III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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